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Forests and Floods.

IN the first number of GARDEN AND FOREST, published nearly nine years ago, there appeared an article by Francis Parkman on the forests of the White Mountains. He showed that these mountains owed the greater part of their charm to the primeval forests that still covered them, and that they brought to the state of New Hampshire a sure and abundant income by attracting tourists and their money. He added that if the speculators who had their eyes on these forest-lands were permitted to work their will the state would find its most remunerative property sadly lessened in value, and that the mountains, when robbed of the woods, would become, like some parts of the Pyrenees, desolate, inhospitable and unfrequented. He added that the preservation of these woods would save the streams which flow from them, especially the Pemigewasset, the main source of the Merrimac, from the alternate droughts and freshets to which all streams are exposed when the mountains in which they take their rise are denuded of their forests. The final sentence of his article was: "This subject is one of the last importance to the mill-owners along these rivers."

During the present month, at the annual meeting of the Amoskeag Manufacturing Company, in Manchester, New Hampshire, the report of Hon. T. Jefferson Coolidge, the treasurer, was read. He spoke of the ruin caused by a flood in April, 1895, when the water rose to a height never known in the Merrimac River before that day. The water ran ten feet deep over the great dam, which was so seriously injured that it took all summer to repair it and replace the granite blocks and columns under the gate-house. But for these repairs the entire dam and the gate-house would probably have been swept away by the torrent which rushed over it on the second of March, 1896, when the water rose a foot and a half higher than it did in the previous spring, carrying away bridges and compelling the factories to stop work and leaving six thousand operatives without employment. Mr. Coolidge added that the only explanation, in his judgment, for the increasing violence of these floods was the cutting down of the forest about the headwaters of the Pemigewasset and other affluents of the Merrimac. The result has thus emphasized the warning to mill-owners sounded by Mr. Parkman and other forward-looking men years ago.

Of course, there is a great deal of misinformation published every year in regard to the influence of forests on rainfall, but no fact in physical science is better established than that the cutting away of timber on high mountains and their slopes is the cause of great variation in the water-flow. The rainfall and melting snows are hurried away more swiftly from highlands on which there is no forest cover, and so the high water becomes an inundation and a calamity, while the extreme low water which follows is almost as much of a calamity. This is not a matter of theory, although the reasons are evident and have been frequently stated in these columns and elsewhere. It is the experience of the Old World which is being repeated in the New, and disasters of this sort will be more frequent and more lamentable unless the safeguards which nature has furnished are respected and preserved. Mr. Coolidge did not state the case too strongly when he said that if the present practices are continued, manufacture by water-power of the Merrimac will become impossible in New Hampshire. No new mills will be put up, the old ones will be driven to the use of steam, and, therefore, they will be put to a great disadvantage in competition with other cities where coal does not need to be transported so far. Certainly the situation justifies Mr. Coolidge's earnest appeal to every one who has the prosperity of New Hampshire at heart to exert his utmost influence to induce the Legislature of that state to protect the forests which still remain.

It is unpleasant to be constantly sounding alarms and predicting calamities. No gift of prophecy is needed to foretell the ruin which will follow if the devastation of the forests of the Appalachian region from Quebec to Alabama goes on for the next twenty-five years as it has done. And who can estimate the desolation which will ensue if the floods are let loose from the still loftier ranges which feed the Columbia, the Sacramento and the San Joaquin, or who can imagine the extent of the inland sea that will roll over the Mississippi valley when the water barriers are removed from the eastern slopes of the great Continental Divide and the sources of that immense water system in the central north? Common prudence ought to arouse the legislatures of the various states and of the nation to face this problem now, which is of more vital importance to the life of the Republic than any question of tariff or of currency.

DR. AUGUSTINE HENRY, of the Chinese Customs Department, well known to all lovers of plants from his many botanical discoveries in central China, is now stationed at Mengtse, in Yu-Nan, situated in an elevated plain 4,500 feet above sea-level and surrounded by mountains reaching an altitude of 8,000 or 9,000 feet. The principal trees of this region, Dr. Henry writes us in a personal letter, are Quercus (four or five species), Viburnum (three species), Hydrangea (one large tree and three or four shrubby species), Sambucus, Rhododendron (two arborescent species), two large arborescent species of Aralia, ten species of Rubus, two of Roses, four or five species of Pyrus, and Fatsia papyrifera, the Chinese Rice-paper plant, growing wild. Near the summit of the mountains growing in the forest are Elelostemma, Panax repens, three species of Polygonum, Thalictrum, Valeriana, Lilium giganteum, four or five Labiateæ, two or three Cyrtandreæ, etc. On lower levels what is probably a distinct species of Pyrus and an Abies resembling Abies Davidiana, Gleditsia Delevayi, with enormous pods, a tomentose Fraxinus, Albizzia, Dalbergia, etc., are found. One hundred and thirty species of Ferns have already been collected in this region by Hancock, ten of them being undescribed species. Dr. Henry writes:

I anticipate that I shall make a grand collection here, as the country is very varied. Only two days off one descends into the tropical valley of the Red River, so there is every kind of climate close at hand. The endemic species are, I think,

numerous, and include many ornamental things. The Orchids growing in the mountain grass are very numerous, indeed, and there is a larger proportion of petaloid monocotyledons than I have seen elsewhere. There seems to be a very distinct edible apple, not yet ripe, which is worthy of note. I find the Peach wild in the ravines, with inedible or barely edible fruit. Rosa gigantea is very common, and must be a glorious sight when in flower. I have been particularly struck by the absence of Laurineæ, which are so conspicuous in the Hupeh flora everywhere. I notice one Acer on the mountain summits. Besides Lilium giganteum there are two other Lilies, one resembling L. longiflorum, but distinct, and the other a yellow Lily, not very large, but pretty. It is also something new, I believe.

In addition to these interesting botanical features the ethnology of the people is most interesting. The people are largely of three races (non-Chinese), Shan, Lolo and Miao-tse, but in the mountains one comes across diminutive people living in squalid villages, cultivating only Buckwheat, pasturing sheep and cattle, and these folk are practically savage autochthons. Pure Lolos are handsome and of Caucasian type in some respects. Of course, these are only my hurried impressions, as I have been here only a short time and have only been in certain parts of the neighborhood.

Baden-Baden.

IN a late issue of *The Gardeners' Chronicle* Rev. Henry Ewbank gives an account of the famous gardens of Baden-Baden, which have been enriched by the business enterprise, the enthusiasm and the rare cultural skill of Herr Max Leichtlin. These gardens have been for many years one of the great European centres of horticultural interest, and our readers will thank us for presenting an extract from Mr. Ewbank's interesting letter.

The Kniphofias are such as I have never seen elsewhere. K. Nelsoni is of great value, because it blossoms the latest of all, and it is certainly one of the loveliest and most elegant of them. K. Natalensis is the most highly colored of the lot; K. Triumph has a kind of bright yellow candelabra-like habit of flowering; and a small yellow one which is not very tall, and has not as yet been named, struck me as certain to please. But, perhaps, I may as well say at once, that the most striking plant in the garden just now is Coriaria Nepalensis—it was so entirely new to me. Max Leichtlin says it has been in full beauty since last July, and is likely to be so till the frost sets in. The crystalline, deep yellow fruit is attractive in the highest degree, and when the statement is added that the shrub is quite hardy in this part of the world, it will be seen that this acquisition from the Himalayas is of great value, and will be much sought after.

There was a new Hedysarum in the borders which I liked very much; Trachelium rumelianum is a nice little flower, and I saw many specimens of Campanula mirabilis, of course not in blossom just now, from which great things are expected. Liatris cylindracea is still very fine, although far from its best; I think it is L. graminifolia that Leichtlin praises the most, but its time had gone by. Thalictrum Delavayi has no need of mention from me, but I never saw such fine specimens as there are here, and there seem to be two varieties which differ very much in the foliage, but are in other respects alike. Some Lobelias are still very attractive. L. fulgens rosea and violacea correspond with their names, and they brighten up the borders exceedingly; they differ from what I have as yet come across. Calceolaria alba should not escape notice; it will be a valuable little shrub if only it is sufficiently hardy. In one of the houses I saw an Agapanthus which throws all others into the shade; it rejoices in the name of A. maximus, var. Krelagei, and while any Agapanthus is good, this must be put in the first rank of all where autumn flowers are looked for. Close by it was a very large Belladonna Lily, Amaryllis Belladonna rosea perfecta, a beautiful thing in its way. Sternbergia macrantha is in all its glory at present; I suppose it is one of the finest of Mr. Whittall's many introductions—the only drawback it has is that it is naked-stemmed and blossoms without the leaves. Gerbera Jamesoni seems to be quite at home with Max Leichtlin, though it is strange to hear from him that it has not done well lately in the way of blossoming, because of the continuous wet. I have a plant at Ryde which must be four or five times as large as any which are here; and though very robust and strong, it did not blossom well this summer in one of the hottest and driest places that could be conceived. If sunshine in one locality puts it out, and rain in another, what are we to do with it? My plant did splendidly in the summer of 1894 and 1895, but it has quite failed this year; and I hear from my gardener that it has done nothing since I left home, some six or seven weeks ago, though it is in a very robust and healthy condition.

Scabiosa Hookeriana is a novelty which has seen its best for this season. I think Max Leichtlin said it had been a puzzle to him for fifteen years. He has two or three good Delphiniums which have not as yet found their way into commerce; one is a sort of dark claret color, which had not at all begun to fade. I noted flowering plants of Galanthus Olgæ Reginæ, but it is nothing more than G. nivalis, with a very precocious disposition, which makes it outstrip all its compeers in earliness; it is, nevertheless, well worth possessing, for by its aid all lovers of Snowdrops (and who is not a lover of Snowdrops?) may cover three out of the four quarters of the year with their favorites, and only be without them when there is quite a glut of other flowers. Old friends turn up here in multitudes, though I miss a good many of those which I have known before. Onosma albo-roseum, Omphalodes Luciliæ, Polygonum spherostachyum, Arnebia echioides, Pelargonium Endlicherianum, Primulas without number; Aubrietias and such like plants abound on every hand. There is an Aubrietia which I want some day to see in blossom very much, for it is called the Beauty of Baden; and if it be that, what a beauty it must be!

The American Persimmon.

AT this season of the year the native Persimmon of the United States is in the perfection of its fruitage. While our city markets know in a limited way of the Japanese persimmon, as grown in Florida, California or the south-west, the American persimmon is comparatively unknown, excepting in some of the larger southern markets, to which the farmers bring it in limited quantity. The American persimmon is not in favor, as commonly known, because of its astringent or puckery skin and because its extreme softness when fully ripe makes it difficult to handle and ship. As a consequence, thousands of bushels rot on the ground every year or are eaten by hogs in pasture.

In the Mississippi valley, from central Indiana and Illinois, southward, the Persimmon may be generally found growing with great vigor. In some regions it is regarded as an intruder, and the trees are classed as almost as worthless as Sassafras-sprouts. It has, however, the merit of producing a fruit which, it is safe to predict, will some day be a popular article of diet on our tables. An examination of the seedling wild fruit shows a wide difference in form and quality. Forms range from round to oval, with varying degrees between, as round-ovate, oblong-ovate, roundish oblate, etc. The fruit from some trees contains many seeds, while others are seedless. With some the pulp is very sweet, rich and appetizing, with the skin comparatively free from astringency, while others are inferior in quality and most undesirable.

The Indiana Experiment Station, through Professor James Troop, the horticulturist, has been giving special attention to the native Persimmon. Many varieties of seedlings have been collected in southern Indiana, and numerous persons have sent us samples of fruit that they regarded as of special merit. Some of this fruit has been delicious, and I am sure would find a ready sale in a city market when its merits once became known. The following varieties are described by Professor Troop in Bulletin 60 of the Indiana Station: Shoto, Early Bearing, Golden Gem, Daniel Boone, Hicks, Kansas, Smeech and Early Golden. All of these have fruit of special merit. Golden Gem was introduced by Mr. Logan Martin, of Clark County, Indiana, and is grown by him for near-by markets. A quantity which he sent to this station was regarded by all who ate of it as most delicious. The fruit is roundish oblong, about an inch and a half or more in diameter, dark orange to red in color, contains but few seeds, and the flesh is soft, rich, sweet and palatable, being quite free of any astringency. This variety commences to ripen about the last of August and continues until October. Shoto has a large fruit, oblong-ovate in form, has but few seeds, and the pulp is of good quality, being in its prime in October.

Hicks has a large fruit of excellent quality, containing but few seeds. Early Bearing also produces a fruit of good quality. Generally speaking, the fruit is improved by the action of frost, which seems to destroy the astringency.

A special study of the composition of the fruit has been made by Messrs. Huston & Barrett in our chemical laboratory, and the published analyses in Bulletin 60 of the Indiana Station are the only ones extant, so far as we know, showing the composition of persimmons. Five samples of wild fruit and one of Golden Gem were analyzed. It was found that the amount of dry matter in this fruit was greatly in excess of that in other fruits. Grapes contain from 8 to 24 per cent., while in the persimmons analyzed, the dry matter ranged from 29 to 48 per cent. A special study of the pulp showed about 71 per cent. moisture, 14 per cent. sugar and over 5½ per cent. albuminous substances and hydro-cellulose. This indicates a food of greater nutritive value than is found in our other table fruits. The persimmon pulp resembles the date somewhat, and was dried with difficulty. The seeds are very hard and flinty, so that the work of preparation for analysis was more difficult than with other American fruits.

The average number of seeds in one fruit varied from 1.74 to 5.07, these figures being the averages from many fruits used. The per cent. of pulp ranged from 82 to 88½.

Persimmons may be budded or grafted in the spring. The seed does not produce true from its kind, hence it is necessary to bud or graft. As a rule, in southern Indiana the trees grow on hilly clay soils, in neglected and worn-out land. It will grow, however, on the lower, richer soils.

Through the process of selection and hybridization, eventually, without doubt, the persimmon will be developed to a degree that will place it among the more desirable of the fruits native to North America. These more improved varieties will be free from astringency of skin, more or less seedless, and, besides having a rich, sweet flesh, will possess good shipping qualities.

Attention is now being directed toward this fruit. Nurserymen are handling the trees, and many letters have been received at this station from both at home and abroad, asking for more information concerning it. The further development of this fruit offers an attractive field for the horticulturists of the lower Mississippi valley.

Purdue University, Lafayette, Ind. *C. S. Plumb.*

Foreign Correspondence.

Cambridge Botanic Gardens.

THE Botanic Gardens attached to Cambridge University are second only to Kew among the public gardens of England, if judged by the extent and interest of the collections of plants they contain. Although only some seventeen acres in area, they are so cleverly laid out as to appear to be at least twice that size. The houses and frames cover an area of 13,850 square feet, and as they are mostly modern in structure they afford accommodation for a large and varied collection of tender plants of all kinds. The houses are all new, having been built in 1888-91 at a cost of £6,000. They consist of a handsome corridor 270 feet long, sixteen feet high and ten feet wide. On the south side of this corridor there are eight handsome houses, and on the north side are the sheds, laboratories, propagating-houses, garden library, stokehole, etc. These all communicate with each other through the corridor, an arrangement of the greatest convenience, both for students and gardeners.

The history of the Cambridge Botanic Gardens is not without interest. It was first proposed to form a "physic garden" as an adjunct to the University in 1696, when the ground was selected and plans made, but no further steps were taken until 1761, when about five acres of ground on the site of the monastery of the Austin Friars was secured at a cost of £1,600. Philip Miller, the curator of the Chelsea Botanic Gardens, the Kew of that period, was consulted with regard to the plans, and a relative of his, Charles Miller, was appointed first curator, Thomas Martyn, the editor of an edition of *Miller's Dictionary of Plants*, being then Professor of Botany. Other curators of these gardens were J. Clarke, P. Salton, J. Don (author of *Hortus Cantabrigensis*), A. Biggs Murray, Mudd, and the present curator, R. J. Lynch, A. L. S., who has held that post since 1879, after having served about twelve years at Kew. The Professors of Botany have been R. Bradley, J. Martyn, T. Martyn, J. S. Henslow, C. C. Babington and Marshall Ward, the present professor, who has only recently been appointed. In 1847, the then gardens were too small and ill-suited for the work they had to do, and a piece of land on the south side of the town, about thirty acres in extent, was secured at a cost of £2,200, to which the collections were transferred. Thirteen acres of this is let as allotments, so that it can be added to the Botanic Garden as required. The gardens were remodeled by Murray, the curator in 1847, who performed the work most creditably.

The main object of the gardens is for the scientific service of the University. This means the cultivation of collections of all kinds of plants representative of the world's flora, grouped for convenience of study and available for use in the dissecting-room and laboratory. In addition to this, large quantities of seedlings, flowers and fruits have to be supplied daily during term time for class-room and other purposes. This entails considerable labor for the garden staff, as on some days a thousand or more specimens have to be prepared for the botany classes. Material for original research by the professor and other botanists attached to the University has also to be kept in readiness. The ordinary show botanic garden knows nothing, or very little, of the latter duties. Although these gardens are the sole property of the University, the public are admitted every week-day, subject to certain regulations.

That the public avail themselves of this privilege is seen in the fact that between two and three thousand visitors enter the gardens on Bank holidays. The gardens are managed by a syndicate composed of the Vice-Chancellor, various head-masters of colleges, the Professor of Botany and several others, but the practical management is vested in the curator in consultation with the Professor of Botany.

During a recent visit to the gardens I noted the following interesting plants flourishing there: Stove-plants—Erythrina Sandersoni, a thick-stemmed, large-leaved species similar to one I have seen under the name of E. Natalensis; Kendrickia Walkeri, a new and beautiful climbing Melastomad, recently introduced from Ceylon, but not yet flowered in Europe; Utricularia longifolia and U. Endresii; Heliamphora nutans, the Roraima Side-saddle plant, Medinilla Curtisii, Jasminum lineare, Bauhinia Galpini, in flower; Saintpaulia ionantha, used as an edging on gravel-covered stages, for which it is perfectly adapted; Aloe plicatilis, an enormous specimen, a century or more old, and probably the most noteworthy example in Europe. Greenhouse plants: Cobæa macrostemma, an old garden plant long lost to cultivation, but recently reintroduced. It has greenish yellow flowers, and while it is quite distinct from the familiar C. scandens, it serves the same purpose as a quick-growing screen or curtain-plant; Polygonum equisitiforme, so very like a Mare's-tail that even botanists have been deceived by it; Mentzelia bartonioides, a beautiful annual as grown here in pots for the conservatory, the seeds being sown in February, and the seedlings pricked six in a four-inch pot, the whole being again shifted into eight-inch pots and kept in a cool house. Thus treated they form a compact, bushy specimen a foot or so in diameter, and produce their large, bright yellow flowers in profusion until winter. Grammatocarpus volubilis is grown in the same way. Begonia gracilis (Martiana) is grown exceptionally well here both inside and out, a bed of it in a sheltered position on a lawn being a beautiful picture even in October. Ferns and their allies are strongly represented and exceedingly well grown, from Tree Ferns to Mosses and Hepaticæ, the latter being a special feature.

Outside, there are many rare plants happily provided for: the hardy Cacti are well represented; Gerbera Jamesoni has leaves as large as Docks and flower-scapes two feet high, bearing large, rich orange-colored flowers; Anomatheca grandiflora, Crinum crassifolium, Capparis spinosa, Anthericum Bowkeri and other reputed tender plants are here in robust health in sheltered corners outside. Hardy Bamboos are well represented; indeed, Mr. Lynch was the first to show how effective these plants are when planted in groups in the neighborhood of water. Parrotia Jacquemontii is doing well in a sheltered position. Hardy Fuchsias are specially cared for; a large collection of Willows, another of Rubus (Brambles) and another of Roses are noteworthy. All kinds of moisture-loving or bog-plants are grouped about the margins of the lake or cozily set in a bog-garden, surrounded by sloping banks upon which rare Ferns, Primroses and select herbaceous plants are at home. An enormous group of Tree Ivy, sprawling over the lawn, is a picture at all times of the year, and the vigorous growth of the Indian Dodder, Cuscuta reflexa, upon its stems gives it a special interest for botanists. Ephedra distachya is here a magnificent specimen twelve feet through. On one of the walls a plant of Thladiantha dubia had grown very freely, and for the last three months of the year it bears hundreds of ovate fruits three inches long and colored scarlet to crimson. This plant is worth growing for its decorative fruits.

London. *W. Watson.*

Entomological.

Another Plum Scale.

PROFESSOR A. B. CORDLEY, of the Oregon Experiment Station, has just sent me specimens of a Lecanium scale numerously infesting a twig of Plum. When I opened the box and saw a Lecanium, I thought at once that the New York Plum scale must have reached Oregon; but a second glance showed that I had before me an insect not before found in the United States. This is, I think, without any question, the European Lecanium bituberculatum, named originally by Targioni-Tozzetti in manuscript, and described by Signoret in 1873. The species is a very peculiar one, and I cannot find that the Oregon examples differ in anything from the European type. The scale in size and shape is like the New York scale, but there are two prominent nipple-like tubercles on the back; and sometimes two others, less prominent, in front of them From each of the larger tubercles to the edge of the scale runs a keel. All this can be seen with a lens of low power, or, indeed, with the naked eye. A microscopical character is found in the tibio-tarsal articulation of the legs, which is thickened. The scales are often more or less marked with white; such examples Targioni-Tozzetti proposed to name pictum.

Curiously, this scale is not recognized as a Plum scale in Europe, but is found upon Hawthorn, Cratægus oxyacantha. It is not, surprising, however, that a Hawthorn scale should attack the Plum. It is widely distributed in western Europe. Signoret reports it as occurring in quantity at Florence, Cannes and Hyères. Mr. Sulc has found it in Bohemia. Mr. Douglas records it from Exeter and Lee, in England, and Mr. Newstead had it from Heacham, Norfolk.

Mr. Cordley's specimens are labeled "No. 18. C. L. Dailey. Salem, Oregon, 1-28-96." Just how troublesome this scale is going to be with us it is too early to predict, but if it becomes abundant it may very likely rival the New York insect.

Mesilla, N. M. *T. D. A. Cockerell.*

When the forest floor is covered with brown November leaves, how cheerful is the unwithering Polypody, clothing the rocks with perennial verdure, defying frost and full of life. How strangely interesting the form of its small plumes, fit to be a tuft about the base of a column. Why should not its form be copied by our sculptors instead of the foreign Acanthus leaves and berries?—*Thoreau.*

New or Little-known Plants.

Aspidium cristatum × marginale, Davenport.

THIS Fern, which was first published and described by me* as a hybrid between Aspidium cristatum and A. marginale, is now figured for the first time from drawings made by Mr. Charles E. Faxon, and I avail myself of the opportunity to give a brief résumé of its history, and to emphasize more strongly than heretofore the essential characters by which it may always be distinguished from its congeners.

Originally discovered by Mr. Raynal Dodge, of Newburyport, Massachusetts, and sent by him to Professor Eaton, who placed it in my hands for elucidation, this Fern received a most thorough and careful investigation extending through a period of nearly two years before publication. Since its publication I have made frequent and careful observations on the plants growing on my own grounds, side by side, with Aspidium cristatum and A. marginale, with the result that I reaffirm more strongly than ever its right to recognition. Whether considered as a hybrid or an independent species, the evidence here adduced must establish beyond any reasonable question its right to a permanent place among our Ferns, while the fact of its having been found in six or seven different stations, wide apart, shows that it is not a mere transitory freak, but a form that is likely to be found in many more stations, if not, indeed, almost everywhere where its probable parents grow together, or near by, under favorable conditions.

Mr. Faxon's drawing (see page 445) was made from specimens recently taken from a plant growing on my grounds, but which originally came from Boxford, Massachusetts, in 1893, and the frond drawn was selected as being typical in character. A comparison of this frond with corresponding fronds of Aspidium cristatum and A. marginale shows that this one combines characters belonging to the other two, the upper portion being similar to A. marginale in breadth and the long, acuminated lanceolate pinnæ and the lower portion, about one-third of the whole, resembling A. cristatum in the shorter, broader and obtuse pinnæ. The texture and venation is nearly that of A. cristatum.

The position of the sori in this Fern varies a little, being sometimes nearly, or submarginal, or nearly medial, but usually a little nearer to the margins than in Aspidium cristatum, while the indusia are generally, before ripening off, convex, as in A. marginale. The bases of the stalks in this Fern are more densely clothed than in A. cristatum, and with similar pale brown scales of two kinds—the lower long linear, the upper ovate—as in A. marginale. But the strongest argument for this Fern's position lies in the structure of the root-stock, that of A. cristatum lying horizontal, with a lateral development of the crown, while in A. marginale and in this Fern the root-stock is a true caudex, growing erect with a central development of the crown, as shown in Mr. Faxon's figures of the root-stock of A. cristatum, from a plant growing in the open, where it had every opportunity to grow erect if so disposed, and the root-stock of this Fern, the caudex being halved to show the erect growth of the stipites which surround the growing end in a circle, exactly as in A. marginale.

To sum up the result of my three years' observations on these three Ferns, I can come to no other conclusion than to consider the present Fern as a hybrid between the other two, and as it may be looked for with every probability of finding it under conditions similar to those under which it has already been found, I append comparative descriptions, giving the most essential characters and the stations from which it has already been recorded:

(*A*) Aspidium cristatum: Root-stock recumbent, crown lateral, crosiers thinly clothed with darkish brown scales. Fig. 36 (5). Fronds (fertile) linear-lanceolate, narrowing below; pinnæ obtuse, or slightly acute. Fig. 36 (4). Sori medial, indusia flat.

* *Botanical Gazette*, vol. xix., p. 494, December, 1894.

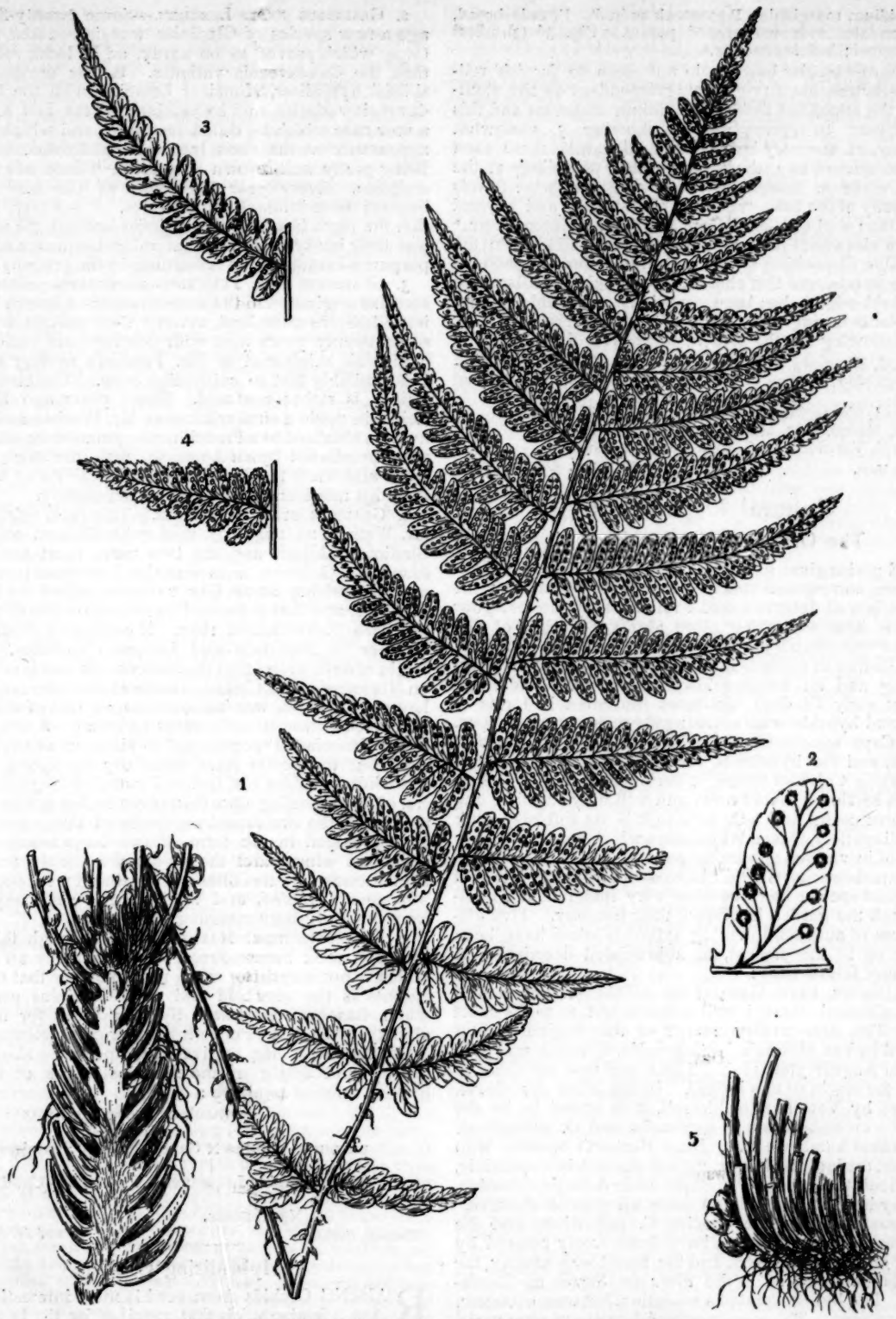

Fig. 38.—Aspidium cristatum × marginale, Davenport.—See page 444.

1. Aspidium cristatum × marginale; two-thirds natural size. 2. Pinnule of same, enlarged. 3. Pinna of A. marginale; two-thirds natural size. 4. Pinna of A. cristatum; two-thirds natural size. 5. Root-stock of A. cristatum; two-thirds natural size.

(*B*) Aspidium cristatum × marginale: Root-stock erect, or suberect; crown central, crosiers densely clothed with pale brown scales. Fig. 36 (1). Fronds (both fertile and sterile), upper two-thirds like marginale; lower one-third, as in cristatum, the upper pinnæ long, acuminate. Fig. 36 (1). Sori submarginal or medial. Indusia convex.

(*C*) Aspidium marginale: Root-stock as in *B*. Fronds broad, lanceolate, with acuminated pinnæ. Fig. 36 (3). Sori marginal; indusia convex.

The fibro-vascular bundles do not seem to furnish reliable characters, the number being dependent on the stoutness of the stipe, but those of Aspidium cristatum and this Fern appear to correspond in showing 5, somewhat obscurely, at the very base of the stipe, and these soon decrease upward to 3, the latter number prevailing at the lamina, while A. marginale shows 5, and in large fronds 7, distinctly at the base, retaining 5 upward to and beyond the lamina; and this last is true also of A. Clintonianum.*

I have elsewhere (*Botanical Gazette*, l. c.) alluded to the remarkable disposition on the part of this Fern to produce abortive fronds, and this character—strongly corroborative of a hybrid origin—has been especially noticeable on my living plants during the seasons of 1895 and 1896.

The following are the present stations for this Fern:

Boxford, Newbury and Merrimac, Essex County, Massachusetts, 1892, also Warren, Rhode Island, August, 1894, Raynal Dodge.
Medford, Massachusetts, October, 1894, G. E. D.
Dover, Maine, 1895, Merritt Lynden Fernald.
Pittsford, Vermont, 1896, Miss Margaret Slosson.

Medford, Mass. *George E. Davenport.*

Cultural Department.

The Origin of Garden Gladioli.

THE praise given to Gladiolus Nanceianus by your London correspondent in Garden and Forest for 7th October, is well deserved, and I think it may interest your readers to hear something more about the origin of this and other remarkable garden races of this noble genus.

The Gladioli of gardens may be distinguished in an early-flowering and an autumn-flowering group. The large group of early Gladioli embraces innumerable forms of species and hybrids, where, among the most common types, are the Cape species Gladiolus blandus, G. cardinalis and G. tristis, and the hybrids G. ramosus (Cardinalis × oppositiflorus), G. Colvillei (tristis × cardinalis), etc. I cannot treat this section in detail now, and will only say that one of the most useful new additions to it is the soft rosy pink Cardinalis variety, Queen Wilhelmina, which has been highly spoken of in various gardening papers.

The late-flowering Gladioli have so improved of late that the original species have become very insignificant, compared with the garden hybrids of their progeny. Five distinct races of autumn-flowering hybrid Gladioli have been sent out up to the present, an abbreviated description of which may follow here:

1. Gladiolus hybr. Gandavensis.—This section is well known, although there is still some doubt as to its exact origin. The first announcement of the original hybrid appeared in Van Houtte's Catalogue, No. 6, which was published on August 31st, 1841. There are two opinions as regards the origin of this hybrid. In the *Flore des Serres*, published by Van Houtte himself, it is stated to be the result of a cross between G. cardinalis and G. psittacinus. On the other hand, we have Dean Herbert's opinion, who found that the indicated cross, "if not absolutely impossible, is so difficult that repeated attempts made during successive, years (by himself and others) have all proved abortive." On the contrary, the Natal species, G. psittacinus and the Caffrarian G. oppositiflorus, have been freely crossed by Herbert and several others, and the result was exactly the same Gladiolus figured in the *Flore des Serres* as Gandavensis. The hybrid created a sensation, but was, of course, soon surpassed. The most successful raiser of new varieties was Monsieur Souchet, of Fontainebleau, and after his death, in 1872, his successors, Messrs. Souillard and Brunelet.

2. Gladiolus hybr. Lemoinei.—Some twenty-five years ago a new species of Gladiolus was introduced from the Cape, which proved to be hardy, or, at least, more hardy than the Gandavensis varieties. It was crossed by the skillful hybridizer, Monsieur Lemoine, with the best Gandavensis varieties, and so he obtained the first hybrids of a new race which he called Lemoinei, and which made its appearance at the Paris International Exhibition of 1878. Being pretty well known at present, it does not need description. Every year the colors of the new varieties become more brilliant and effective. It is a pity, however, that the more beautiful the varieties become the more they lose their hardy qualities, a natural consequence of the little purpureo-auratus blood remaining in the progeny.

3. Gladiolus hybr. Turicensis and Childsi.—Both of these sections originated in the same manner—namely, by crossing Gladiolus Saundersi, another Cape species, introduced some twenty years ago, with Gandavensis varieties. G. Turicensis originated in Mr. Froebel's nursery at Zurich. It is probably lost to cultivation now. The history of G. Childsi is rather confused. Many years ago Herr Max Leichtlin made a similar cross as Mr. Froebel, and sold the hybrids obtained to a French nurseryman, from whom they were purchased by an American firm, the stock of which went afterward to Mr. Childs, of Floral Park, who gave them his name and pushed them successfully.

4. Gladious hybr. Nanceianus.—This race, referred to by Mr. Watson on page 403, is of quite different origin from Gladiolus Childsi, and the two races must not be confounded. G. Nanceianus was the first hybrid of a series now comprising some fifty varieties, raised by Monsieur Lemoine, and first presented to the horticultural public at the Paris Exhibition of 1889. It originated from a cross between G. Saundersi and Lemoinei varieties, and this origin at once shows that the Nanceianus race is an advance on Turicensis and Childsi, as one of the parents, namely, Lemoinei hybrid, was an advance on one of the parents in the other case (Gandavensis hybrids). A few varieties of the Nanceianus race are not so vigorous as could be desired, but the newer ones especially are strong growers, throwing up spikes six feet tall, carrying large-sized flowers, often measuring more than seven inches across between the tips of the two lateral segments of the corolla, which are developed in the form of two large triangular, fully expanded wings, and the colors are simply marvelous. All the trade varieties hitherto introduced were obtained by Monsieur Lemoine, and we have not seen any hybrids from other origins surpassing them.

5. Gladiolus hybr. Massiliensis.—Although this is one of the newest races offered, it is in no way an advance, which is not surprising when we remember that one of the parents is the very old and ugly Gladiolus psittacinus, which has been improved by hybridizing for fifty years already. We only refer to it here for completeness.

Concluding, I beg to give a little pedigree showing the affinity and origin of the principal races of Gladiolus hybrids referred to above:

psittacinus × oppositiflorus
|
purpureo-auratus × Gandavensis × Saundersi
| |
Saundersi × Lemoinei Turicensis (Childsi)
|
Nanceianus.

Haarlem, Holland. *Ernst H. Krelage.*

Hybridizing Orchids.

RAISING Orchids from seed is most interesting work, but it is also work that requires for the best success patience and skill and all the conveniences and appliances known to the most advanced horticultural practice. In a late number of the *Orchid Review*, Mr. H. A. Burberry gives some excellent advice on this matter which it is worth while to reproduce here:

If you have already as much work as you can possibly get

* Mr. C. E. Waters published in the *Johns Hopkins University Circular*, No. 119, June, 1893, a very useful paper on the fibro-vascular bundles in the stipe as an aid to the determination of doubtful specimens, under the title of "An Analytical Key for our Local Ferns Based on the Stipes."

through, and have no more time to spare; if you have not houses built on the most modern principles; if you are lacking patience, then don't attempt raising Orchids from seed on your own account, and you will probably save yourself from much disappointment. If you are fortunate enough to have these necessaries at your command, and feel disposed to try, then, in order to further prevent disappointments, do not be oversanguine about results. Never set a flower if the plant is not in first-rate condition and quite able to bear the stress of producing the big seed-pod, which will take the best part of a year to mature, for it kills weakly plants. Never cross inferior varieties, because the progeny, if reared, would probably be worthless, and cross only those varieties from which, for some reason or another, something good might be expected. Be very careful in labeling the flower directly it is crossed, and remove its own pollen clean away, so that there may be no mistake in the parentage.

When the seed is ripe the pod will split. Now sow the seed immediately on the surface of the compost, selecting plants which have lately been repotted—recently imported plants that are making plenty of roots, in preference to others—but make sure that any plant on which seed is sown will require to be kept moist for at least two or three months afterward. The seed germinates more surely on plants that are suspended near the light. Be careful that the seed is not washed away by the first few waterings the plant receives; afterward there is less danger. If the seed is good it will soon commence to germinate and become round-shaped, about the size of the head of a pin. This is a critical point, for if the compost is not just right those green globules will speedily disappear. Therefore, if the surface of the compost appears not to be in a good sound condition, commencing, as it often does, to become sour and decomposed, it is better at this stage to transfer the seed at once to sweet material in tiny seed pots, placing five or six in each pot, a number of which should be placed in teak baskets and suspended in a shady part of the house and kept continually moist. The cause of the surface of the compost becoming prematurely decayed is often insects living within the pot. In some gardens the compost becomes literally alive with a small species of fly, and these quickly destroy Orchid seed. When once these tiny globular plants become established in their new pots they quickly form a little leaf, and a little root grasps the compost. After this the rest is comparatively easy. They will soon require to be potted off singly in the seedling pots, and then grown on. Do not overpot, and see that fresh sweet compost is supplied whenever necessary.

There is yet a large field open to hybridists. Even supposing quite new crosses cannot at all times be made, there is still no reason why crosses already in existence, if good, should not again be reared. By doing so better varieties may be obtained, and, more than that, advanced as we are in Orchid culture, we have still much more to learn before we can say to ourselves, "These plants we possess, and we are absolutely sure of retaining them," for, like other garden plants, Orchids will sometimes die.

Orchid Notes.—II.

AT this season, also, it is best to repot the Miltonias of the type represented by M. vexillaria. The growths will be well started by this time, and new roots will begin to start from the base. There is an upward tendency to each successive year's growth, and it is necessary to set the plants lower down in the pots, even though the oldest bulbs may be buried, so as to bring the new growth and roots just below the level of the potting material. The roots rarely go very deep in the pots, but rather penetrate near the surface and on the outsides of the pots. They should not be repotted into pots larger than is absolutely required for the current season's growth. One application of water when not required will often cause deep-seated decay that is hard to arrest. It is better not to use loam in the compost, as some cultivators recommend; in other words, make the potting material as porous as possible, so that the large quantities of water needed in the growing period may be applied without danger. With an occasional application of stimulant in a liquid form this lovely Orchid may be cultivated with ease, and improved year after year. Our plants have been taken from the cool house where they have spent the summer, and after repotting have been placed at the cool end of the Cattleya-house, where the temperature will range about fifty-five degrees during the cold weather. A layer of fresh tobacco-stems has been placed under the trellis on which the pots stand to guard against thrips, which, if once they gain a footing, speedily ruin the foliage and blight the flower-stems. Our experience with Miltonia vexillaria has shown that it is safer to keep the specimens rather small than to grow them on into pots larger than six-inch. They are easily divided at potting time, and are much more useful for decoration if grown in moderately small pots. Hybrids from Miltonias are not common, but are represented by one or two notable examples. We have just succeeded in getting a fine seed-capsule on M. vexillaria crossed with M. Clowesii, and hope that good fertile seed may be produced in due season.

Odontoglossum Rossi is one of the prettiest Mexican species, and is very useful for boutonnières in winter. It is easy to cultivate if attention is given at the right time. The growth is maturing now, and a light position in a moderately warm house is needed. The plants have summered in the coolest house, and are taken into more light at this time. If left in the cool house for the winter they would soon dwindle away. O. citrosmum is another Mexican plant that will soon finish growing, and when the bulbs are well matured it is best to suspend the plants near the glass in a light position, giving very little water during the resting season. But we have never found it necessary to let the bulbs shrivel to any degree to induce the plants to flower. We give water sparingly until the spikes appear at the tips of the young growths. Sometimes this is not until midsummer, but rarely does a plant miss blooming. The spikes are strong, often branched, whereas they would be weak if the bulbs were not plump, to aid them at flowering time. There are few Orchids that have such a charm when in bloom as well-flowered plants of O. citrosmum, with the long pendent flower-stems, often a yard long, and the delicious lemon fragrance in early morning. If the plants are not disturbed very often there is no trouble in growing them. We use nothing but Fern-fibre for them and rarely disturb them oftener than once in three years.

Dendrobiums of the Nobile section will now have mostly completed their growth; they need a cooler temperature, or another start will be made, though there is not so much tendency this sunless season as in some other years. Should a start be made we ignore the fact and rest the plants just the same, or the whole machinery of the plant would be thrown out of gear if we attempt to make up a satisfactory growth at this period in a higher temperature. It is best to avoid too much sun at first when putting the plants to rest. I like to see the leaves a healthy green, also the pseudo-bulbs. The bright yellow they assume with exposure is not so well to start from again after the plants are weakened by flowering. The moss in which the plants have grown may be allowed to become quite dry before water is applied, just enough being given to avoid shrinking of the stems.

During the past few weeks very little water has been used to damp the house in which the plants are growing, but as soon as more fire-heat is applied more water must be sprinkled to counteract the parching effect on the atmosphere; and also now on bright days, if there should be any, for we have had but two sunshiny days in three weeks. Most of the plants are now going to rest, nearly all the Cattleyas being in this stage. Less water will be needed to assist in the maturing that leads to abundant flowering. When water is given at the roots we find it well to turn on a little heat under the benches where the largest pots stand, to dry up the superabundance of water that is not desirable at this season. The benches are made of open trellis-work that allows a free circulation of air. If fresh Oak-leaves can be procured, a good supply will be sprinkled with slaked lime and then placed on the ground under the benches. The lime hastens decomposition, kills insects, and the leaves give off a steady supply of food for the roots that are eager to take it up if it is made more available by frequent spraying when fire-heat is much used, as in midwinter.

South Lancaster, Mass. *E. O. Orpet.*

Perennial Phloxes.

THESE are among the best and the most popular of hardy herbaceous plants, being adapted to all places and of the easiest culture. They grow luxuriantly in any good garden soil, and are suitable for the mixed border, single specimens for planting in beds or masses, and they flower from early in August until late in autumn. Great improvement has been made in these plants during recent years, German and French growers having produced some magnificent varieties which, for brilliancy of coloring, size of individual flowers and of the panicles, are marvels of garden skill. The following list embraces some of the most worthy, and includes a number of very distinct colors, from pure white to rich crimson:

Ascanio, dark rosy salmon, white centre, large flower; B. Comte, dark amaranth-purple, the richest, largest and best dark variety; Captain Wilheheny, fiery red, shaded maroon,

extra fine; Consul H. Prost, dark carmine, with violet centre; Duguestin, a distinct shade of violet, with light border; E. Schmidt, pure white, large carmine centre, of the finest size and very desirable; Esclamonde, rosy lilac, shaded white, with purple centre; E. Levavasseur, creamy white, large panicles; Garteninspector Elpel, dark rose, with blood-red eye, a superb variety; Jourdan, rosy violet, large white halo, a choice flower; H. O. Wijers, white, with blood-red eye; Kossuth, rosy-tinted salmon, large panicles; M. Kind, large flower, salmon-red, shaded vermilion; Madame E. Love, fine white, dwarf, one of the best; Orientale, lilac-rose, with white eye, quite distinct; Obergartener Wittig, dark rose, marbled white, with carmine eye; Pantheon, large, tender, rose, very choice; Peter Henderson, light purple-violet, large flower, distinct; Pierre Loti, dark rosy carmine, large panicles; Simplon, carmine-salmon, centre purple; William Robinson, rosy salmon, large violet centre, one of the best.

Riverton, N. J. *William Tricker.*

A Dwarf Stock for the Peach.

THE chief hope for Peach growing in climates where the flower-buds are habitually killed in winter, lies in securing a stock that will dwarf the tree sufficiently to render winter protection practicable. For some years past I have been endeavoring to find such a stock. My first hope lay in the dwarf Flowering Almond, Prunus Japonica (?), but with this I failed to secure a union with buds of the Peach. I would not say that the Peach cannot be successfully budded on this stock, but repeated efforts here in Wisconsin resulted in failure. I inserted a total of several hundred buds in four different trees without securing a union in a single instance. Budding in our dry and warm summer weather is much more difficult than in the eastern states, and it is possible that the Peach may be budded on the Flowering Almond in a climate more favorable for budding.

I next tried a form of the Sand Cherry, grown from pits procured in western Iowa. This shrub is quite dwarf, attaining a height of only two or three feet. Professor Bailey pronounces it Prunus Besseyi, the same species to which the so-called Improved Dwarf Rocky Mountain Cherry belongs. With this stock I have been more successful. I inserted a few buds in it in 1893, and while I had less expectation of success than with the Flowering Almond, I succeeded much better. The Peach grew vigorously on this stock, and by the second year had attained the height of about five feet. The past season, although the best growing season we have had for some years, the Peach-trees on this stock have scarcely increased in height. They have branched rather thickly, and at present are well filled with flower-buds, from which I infer that they will probably not grow larger than they now are. At this height the trees are readily protected by digging away sufficient earth from the roots, so that the trunk may be bent down readily, when the whole is covered with earth. The trees blossomed the past spring and set some fruit, though the fruit failed to mature.

I am also trying Prunus subcordata and a dwarf form of P. maritima, but with what success remains to be seen.

Experiment Station, Madison, Wis. *E. S. Goff.*

Correspondence.

Lilium Washingtonianum.

To the Editor of Garden and Forest:

Sir,—This is a Lily of the high mountains of California and Oregon. In California it is found only in the Sierra Nevada from San Bernardino County north to Mount Shasta, while in Oregon and Washington it is confined to the Cascades, the lofty northern continuation of the Sierra Nevada range. In all cases its home is to be found in the higher, cooler regions, the upper Pine forests, or in the thickets of Wild Cherry, Manzanita and Ceanothus, still higher up, regions where the snowfall is great and melts slowly, and a long period of root-growth is insured. In such places its strong stalk is pushed up quickly as the melting snow gives it the opportunity, and rising to a height of five to seven feet in June, July or August, according to climate, its grand white flowers are unfolded, perfuming the air for miles around. I once saw 10,000 on a single great mountain slope in brush, a count that I can better vouch for as I transferred the bulbs to sacks at a later period.

Lilium Washingtonianum proper has three variations of importance: The type is white-flowered, with purple dots, and has a very large horizontal bulb. Bulbs of this often measure ten to eighteen inches around, and weigh from ten ounces to two pounds.

About Mount Shasta there is a variety with flowers and stalk like the type, but with little bulbs, seldom over two ounces in weight, and averaging less than an ounce for flowering bulbs.

Plants of Lilium Washingtonianum in Oregon and Washington have, according to my observation, broader, more ovate, leaves; I find, too, that many of the scales on them are jointed; those in the Sierra Nevada seldom are. Some scales are two or three jointed, and the joints easily separable.

About Mount Hood, in Oregon, the variety Purpureum is found. This is quite a different Lily from the Lilium rubescens of the northern Californian Coast Range, with which it is often confounded. In bulb and stalk it is like the type. The flowers either open a light purple or a white, spotted and suffused with purple, and quickly becoming a deep purple throughout.

In addition to these varieties, an occasional yellow-flowered sport is found in the California Sierras.

One of the most striking instances of the adaptation of plants to changed surroundings came to my notice recently. I received a consignment of Lilium Washingtoniaum bulbs from a collector in the main Willamette Valley, in Oregon. This is the largest valley of Oregon, a broad plain many miles wide. The size of the bulbs and the large number of double or triple bulbs attracted my attention. Some of the bulbs were immense, and as many as five large bulbs were together. A letter of inquiry brought the following answer:

"I would say that all that grow here in the valley grow in cultivated fields; they do not seem to thrive in pastures, or even along the fence-rows. Every bulb that I have dug has been dug in a field. Their native home is far up among the mountains, in loose, untrodden soil. Fifteen years ago I knew of their growing in only one field in the upper Willamette Valley. They were much noted and admired. From that field they have spread over the surrounding valley in spots. They cannot be said to be very plentiful yet, but the situation seems to suit them perfectly. They usually grow in clumps and some are always injured by the plow."

I may add to my correspondent's interesting remarks that the soil is gravelly, or somewhat sandy. Of course, the cause of the double bulbs is the injuries from the plow, causing the bulbs to "break up." Evidently, the Lilies flower and seed in grain-fields before the grain is cut, and if so there is no limit to their spread, as under prevailing agricultural methods they would soon be below the plow limit. In California and Oregon it is customary to sow grain one season and to merely seed and harrow the second year, thus giving the Lily seedlings two years in which to get below the shallow plowing in vogue. The mature bulbs grow from six to twelve inches down and are perfectly safe. The bulbs will be in very firm, packed soil. The whole incident is suggestive to cultivators. Lilium Washingtonianum has always been regarded as a difficult subject to grow, but if it will thrive under such conditions as my correspondent has outlined the grower need not despair. I may add that out of six hundred bulbs from gravelly soil 169 were from ten to sixteen inches in circumference and averaging twelve ounces in weight, while 331 were from seven to ten inches in circumference and averaged six ounces in weight.

Ukiah, Calif. *Carl Purdy.*

A Good Variety of the Jerusalem Artichoke.

To the Editor of Garden and Forest:

Sir,—For several years I have grown an improved Artichoke with the best results, and I consider it the best of all roots for hogs. My plan is to feed all the artichokes the swine can eat until just before killing, when a few bushels of corn are given to harden the meat. This plan saves many bushels of corn. One acre will keep from twenty to thirty hogs from September until June in healthy and generally good condition. For cattle, horses and sheep there is not a better root grown. One acre will yield from three hundred to seven hundred bushels of tubers, depending, of course, on the fertility of the soil, although immense quantities are produced in any soil. Low land which is too frosty for Corn is entirely suitable, as freezing does not injure them. Drought seems to have but little effect on the plants.

The Improved White Artichoke originated in Europe, where it is largely grown for domestic use as well as for stock. It is entirely distinct from the native or wild variety commonly cultivated. It grows about six feet high, and is covered in autumn with its yellow flowers, which in this country never mature seed. There is thus no danger of the roots covering the farm.

Many farmers are afraid to plant Artichokes because they think they cannot be eradicated. My experience of five years proves that they can be destroyed by plowing under when the plants are one foot high. At this time the old tuber has decayed in giving life to the new top, and no small tubers are yet formed. A more simple way is to put the hogs in the patch somewhat late in the spring, and they will find every one. The tubers are much more round than the common kind and have no deep eyes; the flesh is pure white, very brittle and sweet. Many farmers in Newaygo County are growing Artichokes extensively as a general farm crop. No insect, blight or rust has yet attacked them, and the tops make a fodder superior to Corn when properly handled. Last winter they were tested at the creamery at Fremont with the best results. For table use they are richer and preferable to the type in every way.

Fremont, Mich. *J. H. Van Ness.*

October in Kentucky.

To the Editor of GARDEN AND FOREST:

Sir,—The foliage effects in the Blue Grass region of Kentucky and along the Kentucky and Ohio rivers this year are marvelously beautiful. The indigenous Ash, Beech and Hard Maple trees at historic Ashland, the home of Henry Clay, stand in golden grandeur among the picturesque Pines that were transplanted there in the times when no nurseries existed west of the Alleghanies and there were no means of shipping nursery stock to the then western wilds. In those days these seedling Pines were brought down from the highland forests of Kentucky by hardy mountaineers and sold from door to door in Lexington, as village people are now sometimes supplied with pot plants from a florist's wagon. At Ashland these trees are seen against a background of rolling land, smooth and free from undergrowth and carpeted with the famous Blue Grass sward of Kentucky. All this combines to make a characteristic scene quite unlike any to be found elsewhere, and most impressive by its simplicity and perfection. Some immense Catalpas are among the Ashland trees, with several handsome old American Hollies. The bulk of the indigenous growth is made up of Ash, Sugar Maple and Beech, but in a retired corner of the farm a group of Sour Gums flame like a bonfire.

The high bluffs of the Kentucky River, near Frankfort, were fairly dazzling, as seen from the train or the well-kept pikes that in places traverse mere shelves cut out of the face of the rocky bluffs, with only a frail board fence between the roadway and a sharp incline down to the waters of the river. Besides the prevailing Ash and Maple there were Dogwoods by the thousand, standing singly and in groups, making splashes of crimson. Sweet Gums, Liquidambar, their sharply cut leaves setting them apart from other species even at quite a distance, were here as bright in tone as the Dogwoods, and these took on that rich purplish crimson tone peculiar to themselves. Indescribably vivid were the hues of the Sour Gums, or Tupelo, while here and there among the foliage that sweeps up the steep and lofty river hills magnificent Scarlet Oaks stood like exclamation points in the landscape. A foil to this varied splendor was furnished by a background of the living green of the Red Cedar, and behind all this the broken, but symmetrically layered, limestone through which the river here cuts its bewildering way. To stand at the grave of Daniel Boone, on the top of an abrupt bluff, some 250 feet above the water, and note the landscape up and down the stream is to realize that small rivers have a picturesque beauty that no larger waterway can rival.

The autumn weather, scenery and roads of this part of Kentucky offer a field for bicycle excursions that would seem unrivaled, especially when the historic interest of the state is considered and the cordial hospitality of her inhabitants is borne in mind.

Brighton, Ill. *Fanny Copley Seavey.*

Autumn Color of the Liquidambar.

To the Editor of GARDEN AND FOREST:

Sir,—Among the deciduous trees whose leaves turn to bright colors in autumn the Sweet Gum, Liquidambar styraciflua, stands decidedly in the front rank in this locality. The rich crimson coloring, combined with their beautiful form and glossy appearance, together with the length of time they remain on the trees, makes this one of the best for planting where autumn effects are desired. Among shrubs, the red and orange shades of Berberis Thunbergi and Spiræa prunifolia are most conspicuous, while the Privets are the last of all to shed their leaves, and they remain green and fresh-looking long after other shrubs have become bare. In the hardy-plant border the most attractive-colored leaves were to be found among the low-growing Polygonums. P. repens is the best we have; the bright red leaves make it a most conspicuous object in the fall. P. Chinensis and its varieties, Thunbergianum and scabrum, are well worth growing for the sake of their autumn colors.

Botanic Garden, Northampton, Mass. *Edward J. Canning.*

Recent Publications.

ON page 200 of the current volume it was stated that Professor John B. Smith, of the New Jersey Experiment Station, was about to make a journey to California to study the character of the lady-bird beetles, which feed upon scale insects, in order to see whether it was probable that the importation of any of these species into New Jersey would help in ridding the fruit-trees of that state of the San José scale. Professor Smith has returned and made his report in a bulletin which has been recently published. He explains that south of San Francisco the scale has been kept in check by natural causes, while north of that latitude the fruit growers themselves have had little assistance from natural enemies of the insect, but they have controlled its ravages by persistent efforts of their own. In southern California the twice-stabbed lady-bird and a chalcid parasite, together with climatic conditions, have kept the scale down. Both of these insects occur in New Jersey, but the lady-bird, so effective in California, survives the winters here in small numbers and does not appear on the trees until shortly before the scales begin to reproduce, so that the trees are covered with their larvæ before the beetle larvæ do any effective work, and from that point on, the scale outruns the lady-birds, breeding at least a month after the predaceous insects go into hibernation. The chalcid parasite forms a small factor in the history of the insect on the eastern coast. In California the scale does not begin to multiply until May, and the lady-bird breeds continuously and feeds upon the scale for from six to eight weeks, at least, while it is dormant. In January and February the scales are already preyed upon by the chalcid, and one full brood of the parasite matures upon the dormant scale and produces an enormous second brood when the scales begin to breed, eating up the majority of the young, and clearing out all but a small percentage before they reproduce in turn. Besides this, the intense heat, sometimes reaching 110 degrees in the shade, often kills the larvæ and the recently set San José scales. Of course, these climatic conditions cannot be duplicated in New Jersey. There is no evidence whatever that the Australian lady-birds introduced into California have had any influence in controlling the San José scale in that state.

The conclusion is that fruit growers of New Jersey must follow the example of those in northern California, and fight or lose their orchards. The California way is to treat the trees in the winter with a lime, sulphur and salt wash. Professor Smith gives a formula for several of these washes, but, unfortunately, they cannot be recommended as satisfactory in the east. A wash made of two pounds of good whale-oil soap to one gallon of water, thoroughly applied, has been successful in many cases in New Jersey. Since whale-oil soap varies in character, a wash consisting of concentrated lye, three and one-third pounds; water, seven and a half gallons, and fish-oil, one gallon, which makes a caustic soap, may prove useful. The lye should be dissolved in boiling water and the fish-oil added to the boiling solution. The whole is boiled for two hours, and then allowed to cool. This soap should be used at the rate of two pounds to a gallon of water, with a little lime sometimes added to make the treated part of the trees prominent, so as to insure thorough work. This soap should be dissolved in hot water, and is more effective if applied quite warm; the application should be made while the trees are dormant. There is much interesting matter in this *Bulletin No. 116*, issued by the New Jersey Experiment Station, to which we have not alluded, and it is worth careful study by all fruit growers in the east who wish to make anything like an effective stand against the dangerous San José scale.

Notes.

After the first form of this paper had gone to press we received the following note from Mr. Davenport relating to the hybrid Fern described and figured on pages 444 and 445: "I have just found two more plants of the type form of Aspidium

cristatum × marginale in Medford, Massachusetts, growing in a swamp near the one where my first Medford plants were found, and not far away, surrounded by plants of A. spinulosum, A. Bootii, A. cristatum, A. marginale and A. Clintonianum, more plants of a peculiar form collected by me in 1894. Under date of October 28th Miss Closson writes to me that she has also found several more plants of the hybrid in her vicinity."

The prices for American apples in Europe have advanced somewhat during the past few weeks, the improvement being due to the better quality of fruits shipped. The quantity exported is still phenomenally large. During the week ending October 24th, 148,779 barrels went to Europe from ports in the United States and Canada, and up to this time 1,081,647 barrels had crossed the Atlantic from this country, in striking contrast with the exports for the same period last year, when but 159,875 barrels had been shipped. At the sale in Liverpool on October 28th the demand was said to be very active at unchanged prices, which means about $1.93 to $2 17 for Baldwins, $1.69 to $1.93 for Greenings, and $2.17 to $2.65 for Kings. At the same sale the first shipment of importance of Newtown Pippins realized $2.92 to $4.82 a barrel.

No more delicate and beautiful offering of cut flowers is made now in the high-class florists' shops than occasional vases of pink Bouvardia, fifty cents being asked for a half-dozen clusters. Among the more refined flowers, too, are yellow daisies, their clear, velvety, lemon ray florets in beautiful contrast with the golden disk. In one of these establishments russet oak-leaves are used for embellishment, and in another mounted butterflies seem to hover among the rich masses of bloom, giving a novel, although not altogether an artistic effect. Perhaps no improvement in the flower business is more marked than the superior quality of flowers offered by street venders, and the arrangement of these displays is sometimes remarkably ingenious in the limited space at command, and very tasteful and effective. Florists complain of dull business, although the great demand for yellow chrysanthemums for the sound-money parade caused a sudden and rather unexpected rise for this flower on Saturday. The comparatively new Rose, President Carnot, was sent to this market for the first time during the present week. It is a delicate pink, with petals shading deeper toward the centre.

A correspondent of *The Rural New Yorker* writes that one lesson of the abundant apple crop this year is that the orchards were planted too thickly in western New York thirty years ago. As the branches now interfere it is difficult to move ladders among the trees and difficult to spray, but the great loss comes from the want of color in the apples that grow in the more densely shaded parts of the trees. Even on Baldwins and other red-fruited trees which stand alone, dull-colored or green apples are found on the under side of the branches, and colorless fruit lacks flavor as well as beauty. It is hardly probable that there will be a heavy apple crop after the enormous harvest this year, and many of the trees are broken from overloading. If every other tree were cut out of these orchard forests, the remaining ones would have a chance to recruit and make the most of their opportunities in 1898 and afterward. The question of thinning the apples on a tree in such a time when the yield is so heavy is also a serious one. No doubt, fewer branches would be broken if the fruit had been thinned out in time, but how is it practicable to do this in a large orchard? When apples are so cheap careful thinning would not pay, and the quickest and most inexpensive way of shaking the fruit off or knocking it from the tree with long poles without regard to the individual apples and letting them fall at will seems a rough way of doing this work. It is true, also, that there is a limit to the desirable size of an apple. In a year like this, if the number of fruits on the tree were reduced the remainder would be of extraordinary size, and in some varieties, the Baldwins, for example, very large fruits will not keep well. Even on the overloaded trees of this year the Baldwins are as large as they ought to be.

Japanese persimmons were never seen here in such perfect condition as to quality, variety of form and richness of color, and the growing appreciation of this beautiful and luscious fruit is unmistakable in the large sales of it by wholesale merchants. The receipts of Jamaica oranges have fallen off considerably during the past two weeks, when business has been very dull, owing to the nearness of election. These oranges, packed in Florida boxes, sell for $2.25 to $3.00 a box at wholesale, and repacked barrels cost $4.25 to $5.00 for the best sound fruit. These prices are low, being twenty-five per cent. smaller than those of last year, and do not cover cost of transportation. One reason given for the unfavorable change is the large crop of apples. Attractive-looking grape-fruits, from Jamaica, of medium size, sell for ten to twenty cents each at retail. The larger shaddocks are also seen in some collections, and these bring twenty-five cents each. Although the season proper for Cuban and Florida pineapples extends from the first of April to the close of August, this fruit is imported the year through. The kinds now seen are known in the trade as Egyptian Queen, long and cylindrical, a golden color and with small eyes. These now bring slightly lower prices than the sort known as Red Spanish, though they usually command more money. Red Spanish pineapples are somewhat globular in shape, with very luxuriant tops, large eyes, the prevailing color a golden-red, although a box of the fruits shows a rich variety of color, some being a deep bronze of different shades, and others shades of green. Spanish Queens sell now at ten to fifteen cents each in wholesale lots, and Red Spanish at twelve to twenty cents. Much more showy than either of these is the Smooth Cayenne. Those seen here now are quite green. This variety is of very large size, with immense tufts of leaves, in form similar to Egyptian Queen, and sells at forty cents and upward by the hundred. A few of the kind known as Mammoth Porto Rico, grown from plants transferred from the island of that name to the Keys and the Indian River section in Florida, are also very large and handsome, and command high prices. Seckel pears, from Boston, sell for twenty cents a quart, and the last peaches, from Maryland, at sixty-five cents for a basket holding thirty fruits. Lady-apples cost thirty cents a quart. Large, well-grown quinces sell for seventy-five cents for a half-bushel basket in the retail markets. Alligator pears, probably the last invoice for this season, bring ten to twenty-five cents each, and cocoanuts sell for ten to fifteen cents apiece.

Baron Ferdinand von Mueller, the leading botanist of the southern hemisphere, died in Australia on the 9th of October. He was born in Germany in 1825, and in his early manhood he emigrated to Australia on account of a tendency to pulmonary disease, and began life as a chemist. He was soon attracted, however, to study the native plants of his new home, and began those botanical explorations and labors which he kept up with unremitting perseverance throughout his life. In 1852 he made his first contribution to *Linnæa*, and since then he has been such a constant writer in scientific periodicals that the titles of his papers and books would cover many pages of this journal. There is hardly a botanist or horticulturist of any consequence in the whole world who has not been in correspondence with him, and few botanic gardens or herbaria which have not been enriched by specimens furnished by his zeal and generosity. He was a geographical explorer of rank, and he was associated with every movement for the promotion of science, literature and art in his adopted country, and was indefatigable in originating new industries. Of course, a man so active in so many directions made mistakes at times, but, on the whole, he was a most conscientious, earnest and eminently useful man. In botany, his monographs on the genera Eucalyptus and Acacia and of certain natural orders of plants are not only models of scientific acuteness, but have that practical quality which characterizes the great body of his work. California is especially indebted to him for Australian plants, large numbers of which flourish there as well as they do at home.

Philip Codman died suddenly on the 28th of October, of pneumonia, in Philadelphia, where he had gone a few days before on business connected with his profession. He was only twenty-nine years old, but such were his inherited tastes and capabilities, and so thoroughly was he schooled in the principles of landscape-art, that he was already on the highway to usefulness and distinction. After graduating from Harvard College he passed several years in the office of Mr. Frederic Law Olmsted, and after traveling extensively in the United States and Europe in company with Mr. Olmsted, and in Japan with his uncle, Professor C. S. Sargent, for the purpose of perfecting himself in his profession, he established an office in Boston a year ago and had already designed several important works. Like his brother, Henry Sargent Codman, who died at the same age while in charge of the landscape department of the Columbian Exposition, he had a vigorous constitution, and when he called at this office a few days ago he was the impersonation of health, and this makes his early death seem even more untimely. He had a pleasing address, an unselfish disposition and true manliness of character which won friends everywhere. His loss is a serious one to the profession in which there are so few men with sound artistic views, broad scholarship and thorough training.